LWG
LOWER WILLAMETTE GROUP

PORTLAND HARBOR RI/FS

ROUND 3A AND 3B STORMWATER DATA REPORT

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Recommended for Inclusion in Administrative Record

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Prepared for
The Lower Willamette Group

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LIST OF ACRONYMS AND ABBREVIATIONS

Anchor	Anchor Environmental, L.L.C.
CAS	Columbia Analytical Services
CLP	Contract Laboratory Program
DDT	dichloro-diphenyl-trichloroethane
DEQ	Oregon Department of Environmental Quality
DOC	dissolved organic carbon
EcoChem	EcoChem, Inc.
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
EQuIS	Environmental Quality Information System
FS	feasibility study
FSP	field sampling plan
FSR	field sampling report
HPAH	high molecular weight polycyclic aromatic hydrocarbon
LPAH	low molecular weight polycyclic aromatic hydrocarbon
LWG	Lower Willamette Group
LWR	Lower Willamette River
NOAA	National Oceanic and Atmospheric Administration
PAH	polycyclic aromatic hydrocarbon
PARCC	precision, accuracy, representativeness, completeness, comparability
PCB	polychlorinated biphenyl
PCDD/Fs	polychlorinated dibenzo-p-dioxin/furans
PRG	preliminary remediation goal
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RI	remedial investigation
RM	river mile
SCRA	site characterization and risk assessment
SDG	sample delivery group

Site	Portland Harbor Superfund Site
SOP	standard operating procedure
SSR	stormwater sampling rationale
SVOCs	semivolatile organic compounds
TOC	total organic carbon
TPH	total petroleum hydrocarbons
USGS	U.S. Geological Survey
VOCs	volatile organic compounds
Windward	Windward Environmental, LLC

1.0 INTRODUCTION

The remedial investigation and feasibility study (RI/FS) of the Portland Harbor Superfund Site (Site) includes several rounds of field sampling activities to investigate the nature and extent of contamination at the Site, to assess potential risk to human health and the environment, and to develop cleanup alternatives. The Lower Willamette Group (LWG) conducted a third round of sampling (including Rounds 3A and 3B) and analysis of surface water, in-river sediment traps, sediment core and grab sampling, and stormwater investigations. Throughout the Round 3 stormwater sampling activities, additional stormwater investigations were also conducted by other entities at seven stations near the Port of Portland's Terminal 4 and two stations at the GE Decommissioning Facility. This Round 3A and 3B Stormwater Data Report summarizes the results from the LWG Round 3A, LWG Round 3B, Terminal 4, and GE Decommissioning Facility stormwater sampling activities at locations on the Lower Willamette River (LWR).

The first round of stormwater sampling, Round 3A, was conducted from February through July 2007 and included collection of composite stormwater samples, grab stormwater samples, and sediment trap stormwater samples. The Round 3A sampling resulted in less than the total number of desired samples, as described in the Round 3A Stormwater Sampling – Field Sampling Report (Anchor and Integral 2007a), being collected at some sites. The Stormwater Technical Team1 reviewed the data completeness and determined that there were several substantial data needs required to ensure that the stormwater data set was sufficient to meet the original Round 3A Field Sampling Plan (FSP) objectives. The second round of sampling, Round 3B, was conducted from November 2007 through February 2008 and included collection of composite stormwater samples and sediment trap stormwater samples. Stormwater sampling at Terminal 4 was conducted in two rounds from March through June of 2007 and September 2007 through February 2008. Stormwater sampling at the GE Decommissioning Facility occurred in April, June, October, and November of 2007.

The LWG sampling activities are described in detail in the Round 3A Stormwater Sampling FSP (Anchor and Integral 2007a), Round 3A Stormwater Sampling Field Sampling Plan Addendum (FSP Addendum; Anchor and Integral 2007b); and the Round 2 Quality Assurance Project Plan Addendum 8 (QAPP; Integral 2007). The FSP, FSP Addendum, and QAPP are companion documents to the Round 3A Stormwater Sampling Rationale (SSR; Anchor and Integral 2007c), which describes the reasoning behind the overall sampling approach. The additional stormwater investigations conducted at Terminal 4 are discussed in the Storm Water Evaluation Work Plan (Ash Creek Associates/Newfields, 2007) and the Draft Report: Appendix N – Terminal 4 Recontamination Analysis (BBL, 2005).

A detailed description of field efforts associated with the Round 3A and 3B Stormwater Sampling Field Data Report is included in the field sampling reports prepared by the entities

[1] The Stormwater Technical Team included representatives from U.S. Environmental Protection Agency, Oregon Department of Environmental Quality, and LWG, and was convened in order to develop the framework for a sampling plan.

that collected the samples. Field sampling activities for the LWG-conducted sampling are detailed in the Round 3A and Round 3B Stormwater Sampling Field Sampling Reports (FSRs; Anchor and Integral 2007d; Anchor and Integral 2008). Field sampling activities conducted by the Port of Portland are detailed in the Field Sampling Procedures Report Storm Water Sampling Program Terminal 4 Upland Facility (Ash Creek Associates, 2008). Field sampling activities conducted at the GE Decommissioning Facility are detailed in four stormwater monitoring reports (AMEC, 2007a, 2007b, 2007c, and 2007d).

1.1 RI/FS STORMWATER SAMPLING OBJECTIVES

The objectives of the RI/FS stormwater sampling program as discussed by the Stormwater Technical Team and accepted by the U.S. Environmental Protection Agency (EPA) are to:

- Understand stormwater contribution to in-river fish tissue chemical burdens.
- Determine the potential for recontamination of sediment (after cleanup) from stormwater inputs.

1.1.1 Stormwater Contribution to Fish Tissue Burdens

Surface water chemicals have the potential to contribute to fish tissue burdens (and related risks) at the Site. The relative importance of various sources of surface water chemicals, particularly stormwater, is not well understood. An understanding of the sources to the water column from resuspension of sediment versus other waterborne sources (such as stormwater and upstream contributions) is needed to develop sediment preliminary remediation goals (PRGs) that are protective to fish and of human exposure to fish tissue.

Thus, it is necessary to determine the relative contribution of stormwater (as compared to other sources) to surface water concentrations of selected chemicals at the Site. For stormwater, the relative contribution will be calculated in terms of loading estimates, based on the data presented in this report. To understand the relative contribution of stormwater chemicals to fish tissue burdens, other sources of chemicals also need to be understood. Other potential sources to the water column and fish tissue that have been investigated by the LWG are contributions from upstream surface water, direct atmospheric deposition to the river, over-water discharge, in-river sediments, river bank erosion, and groundwater discharge to the river. Additionally, it is important that the in-river modeling tools used for the Site accurately predict contribution from the water column relative to other potential sources of tissue chemical burdens.

1.1.2 Stormwater Contribution to Recontamination Potential

Stormwater discharges have the potential to contribute to recontamination of sediments near outfalls (and potentially Site-wide for some chemicals) after cleanup has been completed if the discharges contain chemicals attached to settling solids. The

recontamination potential will be assessed at an FS-appropriate level[2] of detail to understand the general extent and need for source controls that will minimize the potential for recontamination of the appropriate sediment cleanup remedies determined in the FS.

To predict whether remediated sediments would recontaminate to levels above the cleanup levels that will eventually be set for the Site, estimates of stormwater loads, developed using the data presented in this report, are needed for input into estimation tools and models.

1.2 CONTEXT OF THIS SAMPLING IN THE OVERALL PROJECT APPROACH

Several evaluation and modeling tools may use the stormwater loading estimates, calculated from the data presented in this report, to meet the above objectives. One of these tools is described in the *Draft Chemical Fate and Transport Model Development and Data Gaps Identification Report* (Anchor et al. 2007). The fate and transport model includes three independent models collectively known as the "Hybrid Model":

- Hydrodynamic and Sediment Transport Model: This model has been developed by the LWG to describe the movement of water and sediments around the Site. This model has been developed in several phases during the project and is most recently described in WEST Consultants (2006).
- The chemical Abiotic Fate and Transport Model: This model was originally developed by EPA in coordination with Oregon Department of Environmental Quality (DEQ) to describe chemical movement and distribution within abiotic environmental media at the Site (Hope, 2006).
- Food Web Model: This model has been developed by Windward Environmental, LLC, for the LWG in collaboration with EPA and partner agencies to describe the movement of chemicals from water and sediment into biota and through the aquatic food web.

The Hybrid Model requires estimates of the chemical mass load (e.g., kilograms per month) from each type of chemical source (e.g., stormwater, groundwater, upstream, etc.) for each of the model-defined cells of the river. This report presents the data that will be used to estimate these loads for stormwater. The methods and results of loading calculations and in-river modeling will be presented in the project RI report.

[2] FS-level of detail refers to the fact that the FS will address issues at the level of detail needed to select preferred remedial alternatives. This is opposed to, for example, a design level of detail, which may require smaller scale, greater frequency, or other types of more detailed information.

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1.3 REPORT ORGANIZATION

The remaining sections of this document include a summary of the data collection activities (Section 2); details on the laboratory sample analyses, data quality reviews, and data management (Section 3); the chemical results (Section 4); and references (Section 5).

Supporting information is provided in the following seven appendices:

- **Appendix A**: EPA-LWG Communications
- **Appendix B**: Field Parameter Measurements
- **Appendix C**: Rainfall Data
- **Appendix D**: Gage Height of Willamette River at Morrison Street Bridge (USGS Station 14211720) during Stormwater Sampling
- **Appendix E**: Data Quality Summary
- **Appendix F**: Data Validation Reports (on CD)
- **Appendix G**: Site Characterization and Risk Assessment (SCRA) Database, Excel Flat File Format (on CD)

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